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Sound and Silence in the Forge: Work, Space, and Communication in Early Cistercian Monasticism

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In Cistercian monasticism, and Benedictine monasticism more broadly, silence and sound were crucial elements in the stability of the monastic community. The Rule of St. Benedict (from here referred to also as the Rule), the guiding text of Cistercian monasticism that was read aloud daily to the members of the monastery, continuously returns to the necessity of silence and demands strict obedience from all brothers of the monastery: "Indeed, so important is silence that permission to speak should seldom be granted even to mature disciples, no matter how good or holy or constructive their talk, because as it is written: *In a flood of words you will not avoid sin* (Prov 10:19)."[1] At the core of Cistercian monasticism, there was a tension between the necessities of silence and the sounds of work and manual labor, both of which were woven into the fabric of everyday life and brought into close contact and friction. Silence was necessary for maintaining order and obedience among the members of the community, and the abbot's control over the freedom to speak essentially produced a hierarchy of speech privileges that allowed him to keep monks and lay brothers focused and attentive to the prayer and manual labor that were essential to the functioning of the monastery. As a rule, silence was to be observed in all spaces of the monastery, but spaces of work, and particularly the space of the blacksmith's forge, were granted certain freedoms from this in order for

[1] Timothy Fry, *RB 1980: The Rule of St. Benedict in Latin and English with Notes,* The Liturgical Press: Collegeville, Minnesota, 1981, 31.

the work done there to be carried out safely and effectively. Not only were smiths allowed to speak more freely of the necessities of their work, but the inevitable sounds of their labor were considered necessary to the function of the monastery. At times, the forge even became the space of prayer, further solidifying the spaces of work as essential to the function of the monastery and warranting their exclusion from the rule of complete silence. The sounds of the forge, from the ringing of metal to the direction of workers to the words of prayer that filled its space daily, indicated practices that were essential to the monastery, as much as did the voices of the monks and lay brothers of the choir.

This paper concerns blacksmiths and the spaces of their work in the context of French and English Cistercian monasteries from the 12th through 14th centuries. I attempt to reconstruct their experiences and consider the space of their work as a center within the monastic context, demarcated by legal, social, and physical boundaries, through which raw materials, tools and objects, workers, and monks flowed. Central to this consideration is the function of sound and silence within the space of Cistercian monasteries, as blacksmithing and blacksmiths, who by and large were lay brothers (see below), were distinctly subject to structures that defined and regulated their ability to speak and communicate, beyond the regulations on speech and sound that applied to the monastery as a whole. Other aspects of the blacksmith's experiences, especially the sounds of their work at the forge and their proximity in space to the other artisans of the monastery, also structured their speech, the sounds they produced, and what they were able to communicate. In navigating the regulatory, physical, and practical structures of monastic blacksmithing, I take the Forge at Fontenay Abbey, a long, four-roomed stone

building that served the monastic community and pulled from nearby forests and mines for the fuel and materials of its metalworking operations, as a case study and central focus. Though I draw comparisons between the Forge at Fontenay and other Cistercian forges the effort to understand how the structures of silence and sound that arise from Cistercian regulations and the practical requirements of blacksmithing shaped the experiences of blacksmiths, Fontenay's Forge remains central to my paper because it most strongly reveals the tensions that existed between the need for silence and the necessity of the sounds of work within the monastery.

After these considerations, I turn to the enforcement of the rule of silence specifically for lay brothers, with a focus on the effects of punishment on their speech. I turn to a revolt by lay brothers and monks at Fontenay in 1190 in order to broaden what kinds of communication the brothers resorted to and had at their disposal. Ultimately, restrictions on communication by lay brothers manifest themselves most strongly in their inability to write, such that their voices only come through from the viewpoints of monks in the written material that survives. In this absence, I attempt to reconstruct a day in the lay brother blacksmith's life by reading the regulatory structures, the practical requirements of their work, and the patterns of prayer that shaped their lives into the space of the Forge at Fontenay.

In order to better situate the reader with the spaces and patterns of Cistercian life, I will give a brief sense of the Order's founding, motivations, and the general architectural layout their monasteries adhered to. The founders of the Cistercian movement came from the Benedictine abbey of Molesme, which was the site of growing

tensions between monks who desired to maintain the economic prosperity and ease of life they had grown accustomed to and those who wished to simplify and harden their spiritual practice. The latter group believed they could live their monastic lives more closely to the word of the Rule and set out in 1098 to settle a new monastery in a different, somewhat more isolated location. After the hardships of building and maintaining a monastery from the ground up, this new monastery, known as Cîteaux, became an attractive center for new recruits from lay society. Bernard of Clairvaux, who started his monastic life at Cîteaux along with his brothers and a number of other novices in 1113, was, in the words of David Williams, "a bundle of energy, a driving force and a dynamic personality - despite quite severe ill-health."[2] Bernard was sent shortly after, in 1115, to become abbot of Clairvaux, which he remained until his death in 1153.[3] His presence in Cistercian life stretched to every abbey of the Order, and his writings and the practices he enacted at Clairvaux served as a model for many of the Order's monasteries. At very least by the 1150s, the monasteries that instituted the practices set forth by the earliest Cistercians within their bounds coalesced to form a formidable institution, in which each monastery was bound by annual meetings, called General Chapter, at Cîteaux and became filiated down a line of mother and daughter abbeys.

The Rule and a host of other regulations that accumulated over the centuries of Cistercian history guided the daily life of each monastery in the Order. For the monks, it was a day almost entirely made up of prayer in the oratory, or choir, from early morning

[2] David Williams, *The Cistercians in the Early Middle Ages,* Leominster, Herefordshire: Gracewing, 1998, 3.
[3] Williams, *The Cistercians,* 3.

to night, punctuated by times of manual labor in the fields or in workshops, eating and praying at the refectory, and listening to chapters of the Rule and discussing necessary projects and concerns at the chapterhouse. There were also times for monks to read scripture individually and times for some monks to write and transcribe holy texts. Certain days held special Masses, such as Sundays and feast days. Changes in activities were punctuated by the sounds of bells or clappers, and were organized in terms of hours of the day, with each new time for prayer constituting an hour. At the day's end, the monks returned to their collective dormitory and slept in silence until awoken for prayer in the middle of the night.

Lay brothers, or *conversi* (singular: *conversus*), were the members of the community who underwent initiation, just as the monks did, but were tasked primarily with manual labor. James France, whose text *Separate but Equal: Cistercian Lay Brothers 1120-1350* I will discuss later in this introduction, provides a broad and deep understanding of the history of Cistercian lay brothers, their relationships with monks, and their eventual disappearance as an institution from the Cistercian Order. They were claimed to be of equal spiritual status with monks as their brothers, despite the fact that their day comprised mostly of manual labor, rather than prayer as the monks' did. Often they lived at the monastery they were a member of, in a separate dormitory from that of the monks, and were designated distinct spaces in the oratory (or choir, within the church). Some lay brothers were sent to granges, which were separate, often distant holdings of land for agricultural production, animal husbandry, and the extraction of ores and minerals, to live and work, returning on Sundays and feast days to the home abbey

for prayer.

In general, abbeys were laid out with a square cloister and an adjacent church (frequently oriented west to east with the altar at the east end) as their center, around which buildings such as the refectory (the space for eating), dormitory, chapterhouse (where the Rule was read daily), infirmary, and others were organized. Buildings for lay brothers, including their dormitories and refectories, were often built to the west of the cloister, distinct but near the monks' buildings. Buildings for crafts and manual labor lay even further outside the cloister center. Marcel Aubert, in the second book of his *L'architecture Cistercienne en France*, provides a synthetic view of the architectural layouts of Cistercian monasteries, tracing the buildings outward from the center cloister and church toward the lay brother buildings and the work buildings.[4]

There are a number of terms in this paper that readers may not be familiar with or that require special explanation in this context, which I will list, define, and explain here. The term "forge" in this paper refers to a site or space at which metalwork was done. This encompasses buildings and spaces of various construction, from timber-framed buildings open to the air, such as the forge excavated at Bordesley Abbey in England, to enclosed stone buildings, such as the restored Forge at Fontenay. I will use "forge" and "smithy" interchangeably, as well as "blacksmith's workshop" and "forge building." The term forge generally refers to a contained structure filled with charcoal or coals, which are heated and fed oxygen through a bellows, or pump, however the term is useful and expedient in referring to the entire space in which blacksmiths did their work.

[4] Marcel Aubert, *L'architecture Cistercienne en France,* 2 vol. Paris, Les Éditions d'art et d'histoire, 1947.

Blacksmithing refers specifically to the processes of heating and shaping iron. The term "work" in this paper generally refers to manual labor or craft, from agricultural work to blacksmithing to shoemaking. Prayer could be considered work, in the sense that it was referred to as *opus Dei*, and chapter 4 of the Rule, "The Tools for Good Works," refers to the monastery as a spiritual workshop: "The workshop where we are to toil faithfully at all these tasks is the enclosure of the monastery and stability in the community."[5]

Of the written sources I use, some are central and essential to any study of the topics I cover. Three books by Chrysogonus Waddell, which are *Cistercian Lay Brothers: Twelfth-Century Usages with Related Texts, Narrative and Legislative Texts from Early Cîteaux,* and *Twelfth-Century Statutes from the Cistercian General Chapter,* are used extensively in this paper both as primary sources for the documents they contain as well as secondary sources for Waddell's analysis of the documents. All contain documents written by Cistercian monks in the 12th and 13th centuries, and for many scholars constitute the founding documents of the Cistercian Order.[6] *Cistercian Lay Brothers* contains a compilation and translation of a number of manuscripts of the *Usus Conversorum,* or Lay Brother Usages, and of the *Breve et Memorale Scriptum,* both of which concern the daily routines and proper behavior of lay brothers. Though it is impossible to know with complete certainty, the regulations of the *Breve et Memorale Scriptum,* which originally guided the lay brothers of Clairvaux, and those of the *Usus Conversorum,* which guided practices regarding lay brothers for a broad swath of the

[5] Fry, *RB 1980*, 29.
[6] For a critique of the place of these documents at the heart of studies on Cistercian life and legislation, see Constance Berman, *The Cistercian Evolution: The Invention of a Religious Order in Twelfth-Century Europe,* Philadelphia: University of Pennsylvania Press, 2000.

Cistercian Order, most probably held sway over the everyday working lives of the lay brothers at Fontenay. The likelihood of the *Breve et Memorale Scriptum*'s influence over the structure of Fontenay's lay brother regulations is heightened by the fact that Fontenay was founded by Bernard of Clairvaux himself and was legally bound to Clairvaux by the mother-daughter filiations of the Cistercian Order that required abbots to visit their daughterhouses regularly. Waddell's treatment of Twelfth Century Statutes follows the work of Joseph Canivez, whose compilation of statutes ranged from the early twelfth century through the end of the Middle Ages, which I was unfortunately unable to access in writing this paper.

David Williams' *The Cistercians in the Early Middle Ages* provides deeply researched syntheses and analyses of research on the Cistercians ranging from metallurgy to the administration of the Cistercian Order throughout its history to the economic bases on which Cistercians from various regions and countries thrived. It has provided a wealth of information on the location of Cistercian forges and mines, as well as on the complexities of the institution of lay brothers. Any consideration of Cistercian metallurgy and lay brothers should utilize this text to its fullest. James France's *Separate but Equal: Cistercian Lay Brothers 1120-1350* is similarly important to this paper, as it outlines in depth the place of lay brothers, who made up the majority of Cistercian manual laborers and artisans, including blacksmiths, in Cistercian monasteries. The breadth of its material and its compiling of manuscript illuminations, statues, and written stories depicting lay brothers were invaluable to the writing of this paper, though there is still room to push his ideas to get a better sense of the confluence of the regulations that structured lay brothers

and the experiences specific to blacksmiths in Cistercian monasteries.

Structures of Sound in the Space of the Forge

In his book, *Separate but Equal,* James France devotes an entire chapter to the idea of two monasteries within the bounds of a monastery, one for the monks and one for the lay brothers. Through a discussion of the layout of the lay brother facilities at a given monastery, as well as the daily movements of the lay brothers through those facilities and the regulated differences in clothing, prayer, and dress between monks and lay brothers, he comes to the conclusion that the idea of two monasteries in one was built directly into the plan of a given monastery. This analysis has been very beneficial to my thought regarding the relationship between monks and lay brothers, but it is somewhat insufficient for thinking through the importance of workspaces, where lay brothers made up the majority but also shared space with monks on an equal ground, such that all were temporarily equal as workers bound by the same demands and regulations. Further, it does not account for the fact of the performance of prayer within the space of work itself, which was mandated for lay brothers from Easter to the thirteenth of September,[7] nor the fact of visits to the workshops by certain monks in charge of directing the lay brothers in a spiritual conference. While France chooses to emphasize the structural and architectural similarities in the layout of monk and lay brother spaces, I find that an idea of opposing centers (the choir versus the workshop), seen through the lens of the necessity of the

[7] Chrysogonus Waddell, *Cistercian Lay Brothers: Twelfth-Century Usages with Related Texts: Latin Text with Concordance of Latin Terms, English Translations and Notes,* Brecht, Belgium: Abbaye de Cîteaux, 2000, 169.

sound they produced, more directly reveals the tensions that underlie the separation of work and prayer within the monastery without resorting to defining spaces as strictly for lay brothers or for monks. This accounts for the overlap not just of the circulation of monks and lay brothers through these spaces, but also the overlap of their function as spaces in which prayer and spiritual guidance was to be heard. In this chapter, I seek to read the complexities of monastic regulations on speech in spaces of work through space of the Forge at Fontenay.

At the abbey of Fontenay, in Burgundy, France near Dijon, there stands a large building just south of the monastery's cloister which housed, among other spaces, a blacksmith's forge. The rectangular stone building (seen in figure 1), which is roughly 53 meters long, 13.5 meters wide, and 11 meters high, lies parallel to a redirected waterway which runs east to west along its southern face. Originally, the building began as a one-room millhouse in the 12th century.[8] Expansions later in the 12th century led to the construction of another two-room building downstream, the east room of which housed a forge and chimney. In the very early 13th century, the two buildings were joined by an extended fourth room, divided into six vaulted sections punctuated by two central columns. Figure 2 shows the building's development across these periods. Shortly after the 13th century addition, the two west-most rooms from the late 12th century housed an automated hammer, which used a cam mechanism that would raise and drop the hammer onto an anvil at the rate of the waterway's flow. The time and labor that would go into forging, shaping, and repairing building materials and tools necessary for timber

[8] Paul Benoit and Denis Cailleaux, *Moines et métallurgie dans la France médiévale.* Paris: Association pour l'édition et la diffusion des études historiques, 1991, 327-330.

construction, such as nails, staples, and hammers, would have been drastically reduced by the addition of the automated hammer. It is possible that the construction of the automated hammer was in response to a growing need among nearby monasteries, granges, and locals for building materials and repairs, and Fontenay's location in proximity to iron mines allowed it a steady flow of raw material for such tasks.[9] The room of the chimney and the forge itself stretched the entire height of the building (whereas the other divisions of the building each had two floors), as one can see in Figure 3. Moving from the long gallery, which possibly served as a storehouse for the fuel and materials of the forge or even housed workers of different crafts, the space of the forge feels cavernous. A reconstruction completed in 2007 transformed the room of the forge into an active reconstructed blacksmithing operation, complete with the automated hammer, seen in Figure 4, whose weight alone must have produced a constant, powerful ring that echoed throughout the forge.

The presence of the automated hammer makes this space close in relation to a forge at Clairvaux, Fontenay's motherhouse, which may too have had an automated hydraulic hammer, or possibly an automated bellows, according to an account of Clairvaux's workspaces in 1135 written by Arnold of Bonneval: "The fullers, and the bakers and tanners, the carpenters, and other craftsmen all fashioned machinery adapted to their tasks, harnessing the gurgling waters to stream through their buildings, banked up and welling forth from the underground channels wherever it was needed."[10] Here we see

[9] Fontenay, despite having its own nearby sources of iron, also pulled from neighboring areas to the north a few kilometers away. Benoit and Cailleaux, *Moines & métallurgie*, 277.

[10] James France, *Separate but Equal: Cistercian Lay Brothers, 1120-1350,* Trappist, Kentucky: Cistercian Publications; Collegeville, Minnesota: Liturgical Press, 2012, 109.

a similarity of interest in the mechanical augmentation of workshops, as well as a similar hydraulic infrastructure through the use of underground waterways, between Clairvaux and Fontenay. Both monasteries had the labor force and means to construct the waterways and automated tools, and it is interesting to see in the passage from Arnold of Bonneval the fluidity of thought between mechanizing each of the workshops. Fulling mills, used in the production of wool, made use of a cam-operated hammer to pound woolen cloth with water mixed with other substances.[11] The Cistercian desire, in the case of Clairvaux, to harness the power of water to make all manner of work more efficient also shows the brothers' ability to think across crafts and apply what was valuable in one to benefit another. Thus the iron-working mill and its automated hydraulic hammer likely derive from the machinery of the fulling mill, of which examples abound, notably at the abbey of Rievaulx on the edge of its precinct.

The fact that the forge building at Fontenay was constructed in stone according to the style and plan of the rest of the monastery, such that the lengths of the church and the forge are parallel along an east-west axis and the ribbed vaults of the forge dialogue closely with those of the chapterhouse, as one can see when comparing Figures 5 and 6, respectively, shows that its planners believed the building would be usable and productive into the distant future, and that despite its auxiliary location and function it was necessarily an integral part of the monastery. It is at Fontenay that we see possibly the closest interaction, spatially, between the forge and the cloister. Here, the separate centers of the choir and the workshop overlap in space strongly, and the implications of

[11] Benoit and Rouillard, "Medieval Hydraulics in France," in *Working with Water in Medieval Europe: Technology and Resource-Use,* ed. Paolo Squatriti, Leiden, Netherlands; Boston: Brill, 2000, 193.

bringing the noise from the forge in close contact with the prayer and silence of the choir and cloister, especially in light of the far-reaching Cistercian regulations on speech, silence, and communication, require unpacking.

A host of laws and regulations guided and shaped the daily work at Cistercian monasteries, creating ordered divisions in space, filling those spaces with subjects of varying social status and authority, and ordering those subjects by rewarding obedience with the promise of communal happiness and salvation, and addressing disobedience through individual physical punishment and humiliation. The foremost set of regulations among them was the Rule of St. Benedict, the foundation of all Benedictine monasticism, sections of which were read every day to the entire community of monks in a setting that demanded their silence, obedience, and attention. There are a number of chapters in the Rule regarding labor, workspaces, and artisans, each of which gives a sense of how these spaces were to be treated and used by the monks, and how they fit into the daily life of the monastery. The role of the cellarer, who was, apart from the abbot, most directly in control of those laboring at the monastery, is laid out in Chapter 31, "Qualifications of the Monastery Cellarer." He was required to be "wise, mature in conduct, temperate,...not proud, excitable, offensive, dilatory or wasteful, but God-fearing, and like a father to the whole community."[12] Upon request, he was in charge of giving out "necessary items," which, in the context of the immediately following chapter on "The Tools and Goods of the Monastery, included the tools and materials necessary for all manners of work. This responsibility was not to be the cellarer's alone, especially if the community was large,

[12] Fry, *RB 1980*, 54.

and he was given assistants at the abbot's appointment. As a father figure for the laboring community, a mirror or surrogate of the abbot, he was also to be a model for the working brothers, such that they would work in his image and feasibly continue his work at other monasteries.

For the same reason, a cellarer's value lay not only in his temperance and moral rectitude, but also in his ability to understand and direct the work he oversaw. Gerard of Clairvaux, brother of Bernard of Clairvaux and cellarer of that monastery, was a paragon of both aspects in the eyes of his brother. Upon Gerard's death, Bernard wrote and gave a sermon describing him:

> Those who knew him knew that his words were scented with the Holy Spirit...Who was stricter than he in maintaining discipline? Who more rigorous in disciplining his body? Who more absorbed in contemplation, more penetrating in discourse? How often in discussion with him have I learned what I did not know, and I who had come to instruct have gone away better instructed...Though he was not highly learned, he had an innate sense that enabled him to perceive many truths, and he also had the illumination of the Spirit. Nor was he accomplished solely in great things, but he was great in small things too. *What was there, for example, that eluded his expertise in building, farming, gardening, drainage, and in the other arts and labors of country people? He could easily direct masons, smiths, farmers, gardeners, shoemakers, and even weavers*...All this I am saying to those who knew him and who have experienced and learned still more about him.[13]

The text is worth quoting at length, not only because of Bernard's eloquence, but to best see the size of Gerard's impact on the community. Bernard considers his own experiences of his brother, ranging from intellectual discourse to aiding and directing the monastery's

[13] Conrad of Eberbach, *The Great Beginning of Cîteaux: A Narrative of the Beginning of the Cistercian Order: The Exordium Magnum of Conrad of Eberbach,* edited by E. Rozanne Elder and translated by Benedicta Ward and Paul Savage, Collegeville, Minnesota: Liturgical Press, 2012, 213 (emphasis mine). James France uses some of this passage to briefly delineate the cellarer's work, though his treatment of it as a succinct outline of the cellarer's duties regarding the lay brothers misses the broader sense that Bernard gives of the inadequacy of his own description in capturing the importance of the cellarer and the breadth of his duties.

laborers, but suggests that his experience does not encompass the entirety of Gerard's work, no matter how well he speaks for his community. Our understanding of Gerard's already broad and diverse areas of expertise is thus both a fragment and an overview of what he was tasked with, such that Bernard's account does not flesh out the mass of day-to-day personal interactions between Gerard and the lay brothers and monks who worked the smithies, gardens, and farms, nor the complexities of properly performing each trade to which Gerard was attuned. The case of Gerard shows us the potentially daily necessity for cellarers and their helpers to enter the spaces of work and verbally direct those manually laboring, as well as the value and importance that both the work and its direction held to the members of the monastery.

In claiming Gerard as a model cellarer, Bernard channels and illuminates Chapter 31 of the Rule, guiding its requirements and expectations of the cellarer to the specific and local context of 12th-century Clairvaux. A similar localizing and contemporizing of the Rule[14] was achieved by a number of specific rules and guides pertaining to the social, religious, and labor roles of lay brothers, who constituted the primary work force of the Cistercians in the 12th, 13th, and early 14th centuries. Chapters of the Rule, such as that pertaining to the cellarer, another specifically concerning the place and roles of artisans in the bounds of the monastery, and a number of others less directly related, were thought through in the context of existing legislation and practices and condensed into texts like

[14] There is an interesting dynamic between the Rule and its later practitioners, since holding oneself to the Rule was a way of rendering oneself contemporary to it, despite the fact that 12th century Benedictines and their offshoots reenacted the rule daily and made it contemporary to their time. There is something to be said about the Rule's timelessness, or rather its malleability across periods of time, and it seems as though the reenactment of the Rule in the 12th century by the Cistercians does not show a self-identification with a 6th century Italian monastic context but rather a layering of an established history of monasticism onto their present, which sought to bring them as close in time to the practices of Jesus and his followers as possible.

the early twelfth-century *Usus Conversorum*, or Lay Brother Usages.

The *Usus Conversorum* is possibly the Cistercians' most direct set of regulations dealing with workers and workspaces, though its greater purpose concerns the regulation of all aspects of the lay brothers' lives, from the refectory to the workshops to the choir. While most of the manuscripts containing the Usages come from the last quarter of the twelfth century and are more extensive, the earliest dates to around 1140, and was likely reflective of practices that were already well established among Cistercian monasteries (since the Usages served more as a set of regulations than as legislation).[15] The sixth chapter, "Places Where They Keep Silence," concerns the places in which the lay brothers were to maintain silence, addressing the dormitory and refectory but largely focusing on the workspaces and the specific conditions under which they could speak. Of note is the emphasis on the smithy and on metalwork itself: "Only in the case of the blacksmiths can a place within their workshop be designated where they may speak in the aforesaid manner concerning necessities, since they can hardly keep silence while at their task without detriment to their work."[16] Among the craftsmen of the monastery (masons, cobblers, millers, weavers, skinners, "and so on"), blacksmiths alone are granted this exception to the monastery-wide restriction on speech. In the space of the Forge at Fontenay, there was ample space for such meetings once the building encompassed the old mill and the larger middle room, though it is impossible to say exactly where such meetings would have taken place.

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[15] Megan Cassidy-Welch finds that the later documents, written around the 1170s and 1180s, were reflective of a set of rules, called the *Usus Conversorum*, written and enacted in 1119 by Stephen Harding, who was then the abbot of Cîteaux. Megan Cassidy-Welch, *Monastic Spaces and their Meanings: Thirteenth-Century English Cistercian Monasteries,* Turnhout, Belgium: Brepols, 2001, 169.
[16] Waddell, *Cistercian Lay Brothers,* 178.

At granges, this rule is relaxed, such that the chapter continues: "Likewise, those at the granges are to observe silence in the dormitory, in the refectory, and in the calefectory, within the bounds designated for this. Elsewhere they can speak with their master concerning (their) necessities, and this standing, and only two at a time…"[17] The "Elsewhere" in this passage is glossed over quickly, but it is a marked contrast from the rigorously applied rule of silence at monasteries and the division of its spaces by the degrees of silence which were observed. Thus the grange, relative to the workshops of the monastery, complicated the status of the lay brother, his ability to move throughout monastic space, and his access to a figure of authority with whom he could speak. On a grange, a lay brother was even farther removed from the central space of the monastery choir, even though he held the same status as his brothers who worked in the shops of the monastery proper. On days when *conversi* were called to their home monastery from the grange, which included feast days and Sunday mass,[18] they were to walk, though Waddell is keen to point out that this regulation would not have applied as easily to those granges that were at great distances from the home monastery.[19] Whether this meant the lay brothers would be able to ride horses to the monastery or take multiple days to walk or even have a chapel proper to the grange,[20] the distance between monastery and grange and the effort it took to travel between them made the grange a largely self-reliant entity.

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[17] Waddell, *Cistercian Lay Brothers,* 178.
[18] France, *Separate but Equal,* 118.
[19] Waddell, *Cistercian Lay Brothers,* 204. Regulations on the distance between granges and the monastery, and between granges and other granges, are numerous in Waddell's *Twelfth Century Statutes,* and in general the rules limiting how far granges could be from their home monastery were relaxed into the thirteenth century. France, too, notes this slippage, France, *Separate but Equal,* 118.
[20] France discusses the increasing prevalence of Mass and altars at grange chapels in the thirteenth century, a departure from previous statutes that banned them, even though grange chapels were legally permitted since the 1150s. France, *Separate but Equal,* 135.

Lay brothers at the grange, like the lay brothers and monks of the monastery workshops, similarly confined to the space of his work during the time for labor, but the bounds of the grange and all of the spaces he could move through within it were designed for his labor and way of life. The grange, for the lay brother, was less apparently an auxiliary space relative to the spiritual life and spaces of the monastery, and was thus more of its own center for those who inhabited it. A lay brother's experience of the grange was likely more analogous to a monk's experience of the cloister and its attached spaces than was the monastic lay brother's. The analogy is strengthened with the presence of the grange master, a lay brother appointed to manage the grange, who essentially served as the cellarer of the grange. He was the person to whom brothers spoke if they had problems and questions beyond the immediate tasks they worked on, though as we saw in in the *Usus Conversorum*, two brothers at most were permitted to talk to him at once. Despite the monthly visits of the *magister conversorum*, the grange was thus a place markedly separate from the monastery, where, despite similarities in having refectories, workshops, spaces for prayer when necessary, the work of the lay brothers was prime, an importance solidified by the increased level of authority granted a select few to preside over the grange's operations.

At a monastery, a lay brother's or monk's experience of work spaces was demarcated by stronger boundaries of movement and speech than those at granges.[21] Craftsmen at monasteries, whether they were lay brothers and monks, were required to

[21] That there were monks who not only worked the fields in times of harvest but also worked in the monastery's various workshops is affirmed by France, specifically in reference to Beaulieu. Because the idea of monks and lay brothers working together at the workshops of Beaulieu was not evidently an incorrect practice, it is likely reflective of a number of other monasteries, especially those whose lay brother populations could not meet the needs of their projects. France, *Separate but Equal,* 109-110.

obtain permission from the abbot, prior, or cellarer (if granted authority by the abbot) to speak to them, and then only about immediate necessities. For a lay brother, this boundary was compounded by his social status within the monastery, where he was claimed to be equal to the monks, as a brother who endured the novitiate and emerged a member of the monastery, but also given less direct access to the abbot and monks and the spaces they would be more likely to inhabit. A *conversus* may get an opportunity to speak with the abbot at the workshop he was assigned to, but the likelihood of their daily paths crossing was far less than that of a monk or higher-ranking official, such as the prior or cellarer. In reference to the Cistercian monasteries of Yorkshire, Megan Cassidy-Welch renders these boundaries in space: "Demarcation of the monastic site reiterated the separations of *conversi*. The lay brothers' living quarters were either the west wing of the cloister, or on the granges...There was little reason, therefore, for the lay brother to be in the cloister at all, and with the establishment of chapels on the granges from the thirteenth century, little reason for them to be in the main monastic church either."[22] In the case of Fontenay, it is difficult to read Cassidy-Welch's analysis onto the space of the monastery. The lay brothers' dormitory was evidently destroyed at Fontenay in the 12th century in order to make room for new buildings that were added to the claustral nucleus.[23] Regardless, there was a place for lay brothers at Fontenay, and the fact that their building was replaced reinforces Cassidy-Welch's point about the divisions set up in space between monks and lay brothers.

Along with the cellarer, the Master of the Lay Brothers, or *magister conversorum,*

[22] Cassidy-Welch, *Monastic Spaces and their Meanings*, 171-173.
[23] Aubert, *L'architecture Cistercienne en France,* vol. 2, 123.

served as a bridge between the monastery and the spaces of work. David Williams' treatment of the *magister conversorum* is exceedingly valuable and comprehensive, supplementing the *Usus Conversorum* with relevant statutes: "[The lay brothers'] spiritual director and confessor was the 'master of the *conversi'*: a monk of 'experience and prudence who would set a good example," and who not infrequently became an abbot himself. Whilst it was laid down (1237) that such an official was to be appointed 'where the number warranted it,' few monasteries would have been without him."[24] He continues, describing the master's participation in the lay brothers' chapter meetings and the weekly rounds of confession he held for them. The master also held a weekly spiritual conference with the lay brothers, either individually or collectively, in their spaces of work. This was replicated at the granges, where he held chapter, confession, spiritual instruction, and "[took] counsel with the granger" on a monthly basis.[25] It is interesting to note, however, that at both the grange and the monastery the master was "not to speak to the *conversi*, nor to assign them duties, nor give them license to speak."[26] The *magister conversorum* would not give directions on work, a task which was left to the leading conversi in the workshop, who would have made use of the distinct space in the workshop set aside for speaking of necessities and assigning daily work. Rather, the *magister conversorum* would give them weekly spiritual direction, which has greater implications for the idea that monks and conversi would not be able to separate their spiritual or even specifically liturgical work from the space of the workshop. The weekly

[24] Williams, *The Cistercians,* 85.
[25] Williams, *The Cistercians,* 85. It is likely that earlier on in the history of the order, when monasteries were smaller and their granges closer to home, the cellarer performed monthly visits to granges (among other responsibilities relegated to the *magister conversorum*).
[26] Williams, *The Cistercians,* 85.

talk would potentially recenter the conversi and monks' thought while toiling away at their work in the smithy, perhaps reminding them the theological weight of their work and how all things were to be done according to the Rule and the lessons of the gospels. Perhaps, since the meeting was to be a spiritual conference, the master's goal was to make up for the fact that conversi had far less exposure to the word of God, and thus his words would be more pointedly directed toward the cultivation of their souls or the need for obedience to God, the abbot, and the Rule that loosely bound them. Yet this spiritual work went on in the space of the workshop, which transformed briefly, due to the conference, from one of manual labor to one of stricter spiritual work. The experiences of the conversi in the space of the workshop were no longer dictated by the rhythms and commands of the materials, forges, hammers, or products they set out to produce, but rather the cadence and direction of the master's speech, the ideas and thoughts he brought for them to carry in their minds.

It is the *magister*'s speech in this case, however, that fills the space of the forge, not that of the working lay brothers. In the moment of the spiritual conference the lay brothers were to stand at attention and in respectful silence, unless the *magister* addressed them directly and asked them to speak. It is unlikely that the lay brothers would be asked to speak in this case, since the space of confession in their chapterhouse was set up specifically for the individual airing of faults and sins to the *magister*. Thus even when voices and speech filled up the space of the forge, it was either the brief concerns and problems of the lay brothers addressed to their immediate superior, or it was the doling out of responsibilities to the lay brother workers, or it was the voice of the *magister*

conversorum, holding spiritual conference with the lay brothers. Ultimately, the regulations of silence within the forge remain strict, even with the added leniency toward blacksmiths of the *Usus Conversorum*.

The transformation of the forge into a space for spiritual work is also seen in the schedule for prayer provided for the lay brothers in the *Usus Conversorum.* The text's *Horarium* calls for the lay brothers, from Easter until the 13th of September, not to return to the church for the hours of prayer during the day, as they would for the other portion of the year, but to pray wherever they worked during the correct hours.[27] This means that for much of the year, the lay brothers of the forge paused their work at the normal times for prayer, set down their tools and projects, and spoke aloud the words they would normally recite in the oratory. One can imagine a small number of brothers in the Forge at Fontenay, perhaps alongside other craftsmen in the great room, leaving their fires and tools for a time to recite prayers and psalms in a kind of unison with the monks in the oratory. Their voices would echo and reverberate in the tall room of the blacksmith's forge, down through the adjacent great room. Their manual labor was replaced for a moment with God's work, filling the space of the forge with spiritual meaning akin to that of the church.

Similar to the *Usus Conversorum,* another text, the *Breve et Memorale Scriptum*, which most likely dates from the mid-to-late twelfth century, serves as a retrospective of the regulations regarding *conversi* that were observed at Clairvaux and its (unnamed) granges. The text gives a sense of what was expected of the *conversi* within the

[27] Waddell, *Cistercian Lay Brothers,* 169-170.

boundaries of a specific monastery and its granges, and it was likely used as a regulatory model that daughter monasteries could make use of. In this text, we see an even deeper meditation on the place of the lay brother in the monastery and the grange. It provides that lay brothers were to keep silence in their spaces of work, but spends considerable time noting the times and places in which this rule was necessarily deviated from. Weavers, among others, were to maintain strict silence except in the case of a senior lay brother teaching a new worker how their work was to be done.[28] Herdsmen were bound to silence only at certain intervals in their work, such as when they rounded the corner of a furrow or when they came across another team of workers on their way up and down the lines of the field.[29] These restrictions on speech and conversation were in effect in the refectory, chapterhouse, and dormitories more severely than in the spaces of work, though the text is similarly strict with regard to the workshops of the cobblers, skinners, and weavers.[30] Blacksmiths were each assigned their own forge, and communication between smiths in the space of the smithy was only to be done by sign language and for problems of necessity.[31] In something of a contradiction with the call for the *magister conversorum* to abstain from directing the lay brothers at work, the *magister* was required to inspect the forge of each blacksmith and observe each at work.[32]

From at least the middle of the twelfth century, a great number of the laws that bound workers and their work had their origin in individual cases brought to the General Chapter each year. Statutes attempted to resolve conflicts among monks, abbots, lay

[28] Waddell, *Cistercian Lay Brothers,* 201.
[29] Waddell, *Cistercian Lay Brothers,* 204-205.
[30] Waddell, *Cistercian Lay Brothers,* 207-208.
[31] Waddell, *Cistercian Lay Brothers*, 209.
[32] Waddell, *Cistercian Lay Brothers*, 209.

brothers, monasteries, and lay people and dole out punishments for incorrect behavior. In this manner, they were legal reactions to existing practices at monasteries, no matter if those practices went against the way of the Cistercian Order in the eyes of the General Chapter. The statutes were thus reflective of past practices and desired future practices, and they give a sense of what the Cistercian Order writ large found to be necessary change for the better observation of their doctrines. Spaces of work are seldom explicitly featured among the statutes, but there are a number that reflected extant regulations. A statute from either 1160 or 1161 mirrors the Rule of St. Benedict with regard to artisans, such that the artisans (in this case both monks and lay brethren), including "scribes, book repairers and book binders, Mass host bakers, glass blowers, locksmiths, [and] wood turners,"[33] were to have their workshops within the bounds of the monastery and were to work according to the hours allotted. This list is not exhaustive, as some manuscripts simply list "artisans" in this statute. It must refer to only those workshops which directly served the monastery, as a number of workshops proper to the monasteries, including smithies, that sent materials from a distance were necessarily far beyond the enclosure of the monastery. Some of these occupations seem absolutely necessary to the function of a monastery, particularly the Mass host bakers and scribes, though it seems as though not every monastery would need a locksmith on call, and could make do with calling on a neighboring monastery's locksmith or even hiring a lay specialist.

In addition to this, a statute from the General Chapter of 1185 establishes, in Waddell's analysis, that: "So often as two monks or lay brothers engage in an exchange

[33] Chrysogonus Waddell, *Twelfth-Century Statutes from the Cistercian General Chapter: Latin Text with English Notes and Commentary,* Cîteaux: Commentarii cistercienses, 2002, 585.

in the presence of abbot or prior, they must address their remarks, not directly to each other, but through the 'third person,' namely, the abbot or prior. When engaged in an (authorized) exchange in the absence of abbot or prior, the two must avoid making any remark directed to a third party - a serious infraction of silence."[34] A statute from Vauclair from the middle to late 12th century, further conditions how monks and lay brothers were to speak: "When speaking to a person in the vicinity of abbot or prior, a monk or lay brother is to speak loudly enough to be heard by them, and is to say nothing he is unwilling to have them hear and understand. Again, when speaking with a layman or a lay brother, they are not to direct their remarks to a third person - a fault styled 'speaking through a third person.'"[35] Both the restrictions on speech in the third person and the requirement to speak loudly enough for the abbot or prior to hear are meant to keep monks and lay brothers responsible for what they say, as well as reinforce the authority of the abbot.

Some reflect the ideas found in the *Usus Conversorum* and *Breve et Memorale Scriptum* and serve to detail further the relationships and positions that defined daily work at granges and monasteries. One such example comes from a list of statutes from the abbey of Vauclair which mention "magistri," who in the context of the statute are not the master of the lay brothers (a more general position), but rather that "the *magistri* are those lay brothers in charge of various shops or departments or work-projects. Outside the times of work, they may not speak to those whose work they supervise. These 'masters' are to be distinguished from the *magister conversorum,* who has overall

[34] Waddell, *Twelfth Century Statutes,* 126.
[35] Waddell, *Twelfth Century Statutes*, 656.

responsibility for the lay brothers."[36] Considering all of the roles of authority that have come about through these various texts, it is useful to structure them to better give a sense of how power and authority of work, workers, and work spaces flowed through the monastery. Though actual practice may have deviated from this structure (certainly at least in cases of disobedience), the following diagram assembles the various roles of authority discussed thus far:

Legal/regulatory hierarchy of monk-*conversus* relationships with regard to monastic labor:

□ = occupies analogous position, direction represents flow of authority
↓ = flow of authority between appointed officials

Abbot □ Prior □ Cellarer (with authority of abbot)
↓
Magister Conversorum □ Assistant to the *Magister Conversorum* (essentially a Prior to the *Magister Conversorum*)
↓
Specific to the granges: Grange Master or Granger (lay brother that acts as a general manager)
↓
Magister _____ (*cementariorum, sutorum,* etc.;
master of certain shop, department, or project)
↓
Conversus

What we begin to see here are the legal and spatial limits placed on the circulation of lay brothers and monks within Cistercian monastic contexts, and how the limitations and requirements set on the speech and sounds of the lay brother blacksmiths shaped their

[36] Waddell, *Twelfth Century Statutes*, 634.

experience of the spaces they inhabited. The laws, rules, statutes, locations, and buildings that separated the lay brothers from daily interaction with monks and the cloister rendered their spaces of work as relatively independent centers of circulation, distinct from the cloister and its circulation of monks, but necessary to the life and function of the monastery writ large. The necessity of the spaces of work that supported a monastery, from the kitchen inside the enclosure to the pastures at its edge and the iron forges of its distant granges, made them not just auxiliary spaces, rings of lesser spiritual importance and greater proximity to the impure secular world that radiated out from the main claustral space, but rather centers of a kind of monastic life in themselves. If the choir was the center around which monks were bound, organized, and active, the workshop, in its iterations from the smithy to the fields to the kitchen, was the center around which the *conversi* were bound, organized, and active. The choir and workspaces were mutual centers that gave each other structure and meaning, despite the simultaneous and undeniable dominance of the choir, whose centrality to the mission of monastic life and whose call for the purity of its monks necessitated locating work spaces as fringe elements in the monastic context, and thus lay brothers, or any workers for that matter, as marginal subjects.

The Forge and its Milieu

The space of the Cistercian forge was the center of a number of monastic workers' everyday experience, and through it circulated raw iron ore and ingots, lead, copper, masses of charcoal and wood, new, broken, and fixed tools, nails, staples, and

other building materials, lay brothers, monks, *mercenarii* (or hired laborers), cellarers, grange masters, and *magistri conversorum*. In Cistercian contexts, smithies occupied a space in tension between relative obscurity, as auxiliary buildings, and utmost importance to the monastery. Possibly more than any other workshop, the products of the forge served as the tools and physical supports of the monastery. Any agricultural project at a monastery or grange required a number of iron implements, from plows and hoes to saws and axes, all of which had to be maintained and would require fairly regular repair or replacement on site. The same was true of kitchens, whose number of pots and pans doubled and tripled with the evidence of separate cooking spaces for monks, novices, abbots, and the sick. Pulling on written evidence from Beaulieu, Williams writes: "Iron was used in church construction, was needed for shoeing horses, for hoops on wheels and shares on ploughs, and for making knives and tools."[37] To this we may add the iron hammers, tongs, anvils, rasps, chisels, and awls necessary to the everyday work of smiths, as well as the stonecutting chisels and hammers necessary for shaping stones for buildings. Most Cistercian abbeys would have needed at least a semi-permanent forge building to meet the needs of their workforce, either near or on the grounds of the monastery proper (as in the forge at Fontenay) or at one of its granges. Only if there was high demand and usage of the space, along with the sufficient funding and materials, would a monastery be able to construct a permanent stone building, which would have accompanying storerooms large enough to keep sufficient stocks of iron, charcoal, and wood.

[37] Williams, *The Cistercians,* 373.

These raw materials would become available to monasteries as they received grants for land on which there were forests (for charcoal), ore deposits (for iron, lead, and copper), ponds and moving bodies of water (for washing ores and powering machines), and open spaces for building furnaces and forges. The various steps and processes of iron production led some monasteries to leave certain granges, particularly those proximate to mines, with the task of smelting the ores, or bringing them to a high enough temperature to allow the iron to be separated from the minerals surrounding it. The resulting material was a mass of iron and slag that needed to be reheated and heavily worked by a blacksmith in order to remove the impurities. Though some monasteries received their iron in this way, from granges at a distance that pre-processed the iron ore, others were close enough to their own sources of iron to stay relatively self-sufficient. Wood also needed to be cut and burned in order turn it into charcoal, a more stable and powerful fuel achieved by burning the wood at high heat with little oxygen.

Though it was possibly most valuable as a fuel for the forges, wood worked into posts and trusses was far less expensive, difficult, and time consuming than the process of working, shaping, and placing stone. Though stone buildings, when constructed well, were less susceptible to weathering, rot, and fire than wood structures (evident in the persistence of stone buildings at granges and monasteries alike and the general absence of wooden ones), the timber-frame forge buildings constructed at Cistercian monasteries and granges were necessarily well-built, sturdy, and constructed with decades of use and activity in mind. There was nothing slapdash or quick about the process of constructing a timber-framed forge, especially since the rhythms of the forge far more closely

synchronized with the temporal, physical world than with the eternal cycles and endless attention to the final state of heaven one finds in the choir. Though few wooden structures are able to withstand weathering and scavenging for wood that accompany the hundreds of years that have passed since the twelfth and thirteenth centuries, there are some cases, as we will see at Bordesley Abbey, where the remnants of old wooden structures bear witness to hundreds of years of activity, reconstruction, and technological augmentation. Stone structures, most importantly the forge at Fontenay, tell a similar story, in which older buildings and workspaces are repurposed and stitched into larger facilities. Stone buildings also permitted the forge to enter into the architectural style of the monastery, thus complicating its auxiliary status and establishing an inextricable link between the spaces of monks and the spaces of lay brothers.

This chapter does not cover the totality of extant Cistercian forge buildings, and cannot possibly do so, but rather collects a number of Cistercian metalworking sites from France and England in the hopes of showing a variety of methods through which abbeys produced iron objects and tools, from producing directly on the abbey site to relegating much of the work to distant granges to a mix of the two. Cistercian mines, smelteries, and forges for iron, lead, copper, and some other metals are accounted for in France, England, Ireland, Wales, Germany, Italy, Hungary, and Poland, among other countries,[38] and though this chapter focuses on abbeys and granges of France and England, there were forges of great importance at sites in all of these countries.

To begin, even those monasteries that have little physical evidence regarding their

[38] Williams, *The Cistercians,* 372-375.

forge sites provide a wealth of diverse approaches to structuring the relationship between forge and monastery. Though its forges and accompanying buildings are not well documented, the monastery of Clairvaux, home to St. Bernard and one of the most important and powerful monasteries in the Order's history, both required and had the means to construct a number of forges at the abbey proper. There is evidence that it had smelteries as well, given that it was able to use phosphate slag, a byproduct of the smelting process, for fertilizer and road metal.[39] The Vita Prima of St. Bernard makes mention of a great many workshops that were built at Clairvaux in a brief amount of time, including mills, leatherworking shops, and smithies.[40] In 1157 in the Wassy area, Clairvaux acquired mining and smelting rights and operated an iron making (smelting) grange called Blinfay, which was its highest producing source of iron. La Forgeotte was another prominent iron-smelting site associated with Clairvaux, though this is likely different than the La Forgeotte that was tied to Cîteaux, unless David Williams erroneously attributes the grange to Clairvaux.[41] Regardless, La Forgeotte and Blinfay would likely have supplied both Clairvaux and a number of other nearby monasteries. Marcel Aubert, in his extensive treatment of the architecture of the Cistercian Order, also finds blacksmithing activity in Wassy and at Clairvaux proper.[42] This is buttressed by the fact that the *Breve et Memorale Scriptum*, which comes from Clairvaux, requires its *magister conversorum* to check each of its blacksmiths workspaces and the labor they did. This likely applied to the granges as well, suggesting a vast number of individual

[39] Williams, *The Cistercians,* 373.
[40] France, *Separate but Equal*, 109.
[41] Williams, *The Cistercians,* 373-374.
[42] Marcel Aubert, *L'architecture cistercienne*, vol. 2, 160.

forges within the abbey precincts and outside at its various granges.

Cîteaux, the first house of the Cistercian Order and its legal center for the 12th through 14th centuries, must have been home to a number of forges, as it was the motherhouse of a great number of growing monasteries even from the early 12th century. In 1217, Cîteaux was in possession of ore prospecting rights, which indicates that it already had blacksmithing operations in full swing.[43] La Forgeotte, a neighboring grange just to the north, was its main source of iron. It is possible that it was the first site at which the monks of Cîteaux decided to build their monastery. Having departed from Molesme, they found their first place of foundation to be ultimately unsuitable to their work.[44] Clairvaux and Cîteaux appeared to have followed a similar organizational model for bringing in the iron they required, relegating the processing work to outside granges but maintaining a number of smiths and smithies that the monastery proper.

Moving up to England, Furness Abbey, a great deal west of Yorkshire, had a number of land holdings which aided its production of iron, one of which was at Alinscale, a site of mining and smelting, with workers, likely lay brothers and *mercenarii* or paid laborers, and animals to carry the iron from the worksite to whichever abbey it was to be taken to.[45] According to Williams, Furness owned upwards of forty forges, though it is unclear how many of these were at Furness Abbey itself or nearby.[46] Regardless of where all were located, Furness' iron-working holdings were so

[43] Williams, *The Cistercians*, 374.
[44] Patrick Arabeyre, et al, *Pour une histoire monumentale de l'abbaye de Cîteaux, 1098-1998,* Vitreux: Revue Cîteaux, commentarii cistercienses, Abbaye d'Arcy; Dijon: Association Bourguignonne des Sociétés Savantes, 1998.
[45] Willams, *The Cistercians,* 374.
[46] Williams, *The Cistercians,* 375.

far-reaching and numerous that its income from these forges in 1291 was nearly double that from its flocks of sheep, which is important since wool sales and production generally dominated the economies of English Cistercian abbeys.[47] Further research into Furness would grant a clearer look into the economics of the Cistercian iron trade, and its enormous number of forges and high income from iron suggest that great monasteries such as Clairvaux and Cîteaux likely would have participated in fairs and markets in order to trade iron in excess of their immediate needs.

A comparable monastery is seen at Rievaulx, the first Cistercian monastery in Yorkshire and a filiated daughterhouse of Clairvaux, which was home to a number of workshops, including a fulling mill and, much later in the 15th century, a smithy with a number of resident smiths. It is likely that Rievaulx was home to forges before the 15th century, and it is certain that some of its land holdings and granges did operate forges since its early years in the 12th century. In the 1140s, it was granted multiple forges and land for establishing forges, one of which was a grant of fifteen acres for building iron foundries.[48] The granges that were holdings of Rievaulx in west Yorkshire from the middle to late 12th century, all of which were engaged in ironworking and all of which were at a sizeable distance from the monastery proper, are as follows: Faweather, Halton, Shipley, Heaton, Flockton, Shitlington, Blacker, Midgely, and Stainborough.[49] Archaeological evidence of ironworks is present at Halton, and Rievaulx's operations at Shitlington were known to have mineral rights and rights to construct forges in order to

[47] Williams, *The Cistercians,* 373; for wool production and sales, see 355-361.
[48] Williams, *The Cistercians,* 375.
[49] Peter Fergusson and Stuart A. Harrison, *Rievaulx Abbey: Community, Architecture, Memory,* New Haven, Connecticut: Yale University Press, 1999*,* 42.

provide Rievaulx proper with iron and utensils.[50] Rievaulx and its holdings serve as a strong example of the flow of iron and its products from distant granges to the abbey itself, and it is again useful for thinking through the less-well recorded and evidenced cases of Clairvaux and Cîteaux, especially since their filiation brought the abbot of Clairvaux (or his surrogate) to visit Rievaulx once a year and brought the abbot of Rievaulx to Cîteaux once a year.

Beaulieu, in Hampshire, England, is known to have been home a number of forges by 1270 on the basis of an inventory done at the time, which indicated a vast array of workshops and workers, comprising both lay brothers and monks.[51] Beaulieu's use of iron in church construction, horseshoeing, cart and plow repair, and knife and tool-making is acknowledged earlier in the chapter, and just as the circulation of iron evident at Rievaulx, Furness, and their granges helps give a sense of broader Cistercian practices, the necessity of the ironwork done at Beaulieu makes it strongly applicable to the broader world of Cistercian metalworking practices.

There are, beyond these written accounts, cases of extant forges in various states of ruin across a number of Cistercian abbeys. Kirkstall, in west Yorkshire, had space enough for a standard forge as well as for bell foundries for small bells.[52] Pits would have been dug in the floor of a workspace in order to fit the bell mold. Kirkstall's forge, like many of the forges examined later in this chapter, was part of a larger complex and was adjacent to a stable. It housed two hearths, a number of anvils and bellows, and had

[50] Fergusson and Harrison, *Rievaulx Abbey,* 42.
[51] France, *Separate but Equal,* 109-110.
[52] Williams, *The Cistercians,* 223.

plenty of additional space for movement or storing materials and fuel. Outside of the monastery, Kirkstall also had land holdings with mining rights, as in the case of Seacroft, where Kirkstall was required to fill in the mines the workers had dug to retrieve the ore, a common practice for Cistercian abbeys that made use of land from grants.[53] G. G. Astill, in his treatment of the Bordesley Abbey forge site, uses the archaeological plan of the Kirkstall forge to draw comparisons among Cistercian forges, including those at the monasteries of Kirkstall, Fountains, and Bordesley,[54] seen in Figure 7.

Evidence for the forge at Fountains Abbey, in northern Yorkshire, dates it to the 14th century, when the abbey's woolhouse, which had served as a storehouse, malthouse, brewhouse, and fulling mill from the mid-12th century, was converted into a series of workshops due to the need to repair the abbey church.[55] The woolhouse, whose plan can be seen in Figure 8, was a stone building roughly 20 meters wide and 50 meters long of roughly rectangular shape, which underwent a series of additions and repairs from the 12th to thirteenth centuries. The storeroom constituted the north half of the complex, while the south end housed the malthouse on the ground floor and the brewhouse in the upstairs (as suggested by the water pipes that lead upward). A small forge with tongs, hammers, and metal fragments was found, dating to the time of the repair of the abbey church, along with glass fragments (suggesting glaziers) and a pit and workspace for bronze casting. In the 14th century, an obliquely-angled obedientiary's office was added to the northeast corner of the complex, possibly in order for the work to be more easily

[53] Williams, *The Cistercians,* 374.
[54] Grenville G. Astill, *A Medieval Industrial Complex and its Landscape: The Metalworking Watermills and Workshops of Bordesley Abbey,* CBA Research Report 92, Council for British Archaeology, 1993, 280.
[55] Glyn Coppack, *Fountains Abbey: The Cistercians in Northern England,* Stroud, Eng., and Charleston, S.C.: Tempus, 2003, 95.

monitored. Fountains is a strong case in which the forge was subsumed to and integrated into extant spaces built of stone, and the multiplicity of crafts undergone in the building throughout the centuries gradually morphed the shape and size of the building.

Change and reconstruction also defined the forge at Bordesley, which underwent a number of additions and reconstructions from the mid-12th century to the early 15th century, after which it was demolished and abandoned.[56] Its structure throughout the centuries was timber-framed, with postholes dug for the main supports, and it was thatch-roofed in its earlier stages and tile-roofed in its later stages. In the mid-12th century, a small workshop was built, roughly seven meters long by four meters wide, which housed a forge. In the late 12th-century, the building was completely replaced, though kept in the same location. The new building was roughly twelve meters in length and ten meters in width, with an added mill and mill race on its south end, seen in the reconstructive illustration in Figure 9. It is very likely that the mill was added to power an automatic hammer, which would have been immensely useful to the forging and repair efforts undergone in the building, and even a water-powered bellows would have been possible and beneficial to expediting the process of producing finished objects. The Cistercian use of hydraulic power for metallurgical activity is discussed by Paul Benoit and Joséphine Rouillard in their chapter on medieval hydraulics in France, where they affirm the importance of Cistercians to the developing technologies of automated hydraulic hammers, among other machines.[57] These quasi-industrial efforts are evidenced

[56] Astill, *A Medieval Industrial Complex*. The text in its entirety is worth careful reading, as the layers of use and reuse of the space are present throughout Astill's archaeological analyses.
[57] Benoit and Rouillard, "Medieval Hydraulics in France," in *Working with Water in Medieval Europe*, ed. Paolo Squatriti, 193-197.

by the archaeological abundance of nails, metal fragments, horse bridles and shoes, iron tools (including chisels, axe heads, and metal punches), knives, and a great number of other objects across the centuries. Of note are a claw hammer from the late 12th century (an illustration of which is provided in Figure 10), which was forged with an iron core and a martensite (steel) exterior, an axe blade from the 13th century, and a number of knives from the 13th century. More so than any other monastery forge discussed in this chapter, Bordesley's forge gives a striking material sense of its products and structure. Its wooden construction, though it fell victim to fire and reconstruction, conveys a view of a highly productive, near-industrial Cistercian blacksmithing without resorting to the expense of constructing a stone building.

These buildings help to inform the space of Fontenay's forge, showing similar modes of development over time and revealing the flexibility of these spaces to serve as storage and workshops for a variety of crafts and technologies. More research needs to be done into the spaces of forges at granges as well as into those situated at monasteries, both of which would undoubtedly provide a more well-rounded picture of Cistercian metalworking.

Silence, Communication, and Punishment

Though I am specifically interested in how the regulations on speech, silence, and conversation shaped the everyday life of lay brother blacksmiths at Fontenay, especially in light of the proximity of their workspace to the monks' spaces, it is useful to revisit the regulatory texts of the lay brothers, to delineate the legal and punitive boundaries placed

on the movement and speech of lay brothers at work in the forges. The most important regulation to consider regarding lay brother blacksmiths and their spaces of work is the chapter of the *Usus Conversorum* that deals with silence in the workplace. As was established before, special treatment was given the blacksmiths of the monastery to speak in a designated place in their workshop for matters of necessity. In this regulation there is a prudent acknowledgement of the difficult and dangerous work of blacksmiths,[58] who must coordinate with each other to allow for safe and efficient work. Yet the intense regulations the monks and lay brothers faced on a daily basis must not overdetermine their experiences, as the rules and laws of the Cistercian Order were constantly being tested by disobedient lay brothers and monks.

The fact that some lay brothers did not fully obey the orders of their superiors was constant in Cistercian life, as is evident in James France's writings on the disobedience of lay brothers.[59] It is easy to get lost in the mass of regulations that are brought to bear on the lay brothers and miss either their ability to work around the rules or the possible leniency of their superiors. France is also right to account for the fact of friendships among lay brothers and between lay brothers and monks and higher-ranking officials at the monastery. Such is the case of a story he reproduces from the Cistercian monastery of Stratford Langthorne, in which a lay brother named Roger reveals to the author, his friend

[58] This regulation has strong resonances with ideas about safety in the forge put forth by Theophilus Presbyter, a pseudonymous Benedictine monk-priest in 12th century Germany and author of a three-part treatise on painting, glasswork, and metalwork. Theophilus, in a chapter on creating bells for churches, remarks that the difficult and dangerous work of pouring the molten metal into a bell mold requires workers who have presence of mind and who are quick and keen enough to prevent tensions from building and accidents from happening, both of which were "to be guarded against at all costs." Theophilus Presbyter, *De Diversis Artibus*, translated and edited by C.R. Dodwell. London; New York: T. Nelson, 1961, 154-155. I will return to Theophilus in a later discussion of literacy and communication among lay brothers of the Cistercian Order.

[59] France, *Separate but Equal,* Chapter 9.

and a monk, the fact that as a novice lay brother he grew close to another novice, Alexander, with whom he shared "all the secrets of my heart...and he did the same with me."[60] These are valuable cases, and they flesh out the times in which lay brothers were able to confide in their closest friends and express their feelings without fear of punishment. However, it is this fear, and promise, of punishment that made cases like these largely the exception, and silence largely the rule.

On the subject of punishment for transgressions, Chapter 18 of the *Usus Conversorum* states: "A lay brother who is disobedient to any whomsoever master assigned him, for his penance takes his meals for three days seated on the floor before his brothers in the refectory, and without a napkin. He also receives the discipline in chapter."[61] Another case, a statute from 1186, holds that, in addition to the penance established by the UC, lay brothers would be flogged: "a flogging (or discipline) in chapter," in Waddell's words.[62] Here, there is both the threat of the law, with the cultivated desire not to be flogged or be subject to humiliation and debasement in front of one's community, and the actual performance of the law. Lay brothers, as they moved through the novitiate and into their new lives at the monastery, would become acquainted with punishment, if not on their own bodies then on the bodies of their fellow lay brothers who were unable to follow the regulations. Punishment was about retribution for a transgression, as well as the establishment of precedent, fear, and certainty in the minds of the brothers with regard to breaking rules, such that it was pressed into the minds of all

[60] France, *Separate but Equal,* 177.
[61] Waddell, *Cistercian Lay Brothers,* 191.
[62] Waddell, *Twelfth Century Statutes,* 134.

brothers, not just those who sinned. In discussing the fact of monk and lay brother disobedience, France writes: "Many acts of disobedience, conspiracies, rebellions, violence, and even homicide, not only among lay brothers but also among monks, were recorded in the statutes of the General Chapter and other legal sources...In the *exemplum* literature disobedience is the most common lay brother transgression."[63] As France notes, the lay brothers in the eyes of the monks who wrote *exemplum* literature were very much capable of disobedience, and for them the punishment for disobedience extended beyond punishments in the refectory. There are numerous stories of lay brothers getting tossed around and beaten by devils,[64] stories which would have likely been familiar to lay brothers even if they could not read texts. Punishment for transgressions thus manifested in physical and spiritual ways, both of which would have held most lay brothers to good behavior and silence where commanded.

Though there are myriad reasons why lay brothers and monks might have revolted, the history of the Cistercian Order saw many rebellions by the efforts of lay brothers and monks alike. I am again indebted to the work of James France, whose writing on this subject provides a broad collection of rebellions and transgressions, from vague intimations of lay brother disobedience to the intimate details of larger conspiracies and rebellions, as well as murders.[65] He cautions when reading through the various statutes of the General Chapter that not all accounts of violence would be found there, and many were locally dealt with and recorded. One occasion of violence that was

[63] France, *Separate but Equal,* 207.
[64] France, *Separate but Equal,* 209.
[65] France, *Separate but Equal,* Chapter 12.

recorded in the Statutes was done by a lay brother at one of Fontenay's granges in 1233.[66] Oddly enough, France leaves out of his consideration a statute from 1190 which details a rebellion at Fontenay which both lay brothers and monks organized and enacted. Waddell comments on this event, finding that "The Fontenay conspiracy of 1190 seems to have been especially serious, involving the destruction of one of the abbey buildings. All other building projects at the abbey and at the granges are to be suspended until the destroyed edifice is rebuilt - under pain of the interdiction of the Divine Office. As a last resort the rebels and their adherents are to report to the motherhouse, Clairvaux."[67] There is much to unpack here. To begin, the General Chapter saw this event as a serious enough rebellion to address it there and demand the punishment and removal of the rebels to their motherhouse. The destroyed building is a vexing aspect of this event, as the location and function of the building is not addressed nor is it clear why monks and lay brothers would revolt and attempt to destroy a building in the process. The halting of building projects is particularly interesting because it indicates either that there was knowledge of building projects underway at Fontenay or that building projects were regular enough for this to be a necessary comment. In some sense, the halting of building projects is rather a call for Fontenay to direct all of its material and work resources toward repairing the building. The fact that the building projects at the granges were to be stopped as well indicates a heavy investment by the monastery in directing the building projects at its granges, as well as a tenuous but possible call for lay brothers at the granges to return to the abbey to help rebuild, especially if the situation was so dire. The timing of this event is also

[66] France, *Separate but Equal,* 276.
[67] Waddell, *Twelfth Century Statutes,*

important in considering the construction of the abbey forge, which underwent a series of building efforts throughout the late 12th century until the original mill building and western chimneyed building were stitched into one four-roomed complex in the early 13th century. It is highly likely that some part of the forge building project was affected and delayed by the rebellion, and beyond that, the event would have lived on in the memories of all the community members at Fontenay, from the lay brothers and monks who were not part of the conspiracy, to the abbot and prior and cellarer. Perhaps the memory of this event strengthened the everyday enforcement of regulations on silence and obedience, or made punishments for transgressions and disobedience more swift and severe. The proximity of the forge to the rest of the monastery already allowed the cellarer and *magister conversorum* to keep watch more easily on the lay brothers at work, and in the wake of the rebellion they must have benefitted from this proximity even more.

Cistercian regulations on everyday speech in the monastery's spaces of work were a central part of a lay brother's daily life. These restrictions certainly prevented lay brothers from freely communicating with each other about their thoughts and reflections on their work and the spiritual life they lived, particularly while in the space of work itself. Though lay brother rebellions could be construed as a voicing of grievances, an assertion of collective voices responding to collective problems and desires, such expressions were cut down by institutional punishments and constructions of rebels as acting out the will of the devil. These forms of communication or expression, from everyday speech to violent rebellion, were avenues that lay brothers were restricted from engaging with. These, however, were not the only mode of communication that the

regulations of Cistercian life prevented. Lay brothers were assumed to be illiterate and were denied any positions or training that would have allowed them to become literate. They were not permitted to read or write, and thus had no access to any written forms of expression. The prevalence of histories and accounts written by monks, including the primary sources from which I have drawn in this paper, attests to the absence of the voices of lay brothers, those who worked the forges or any of those for whom the workshop was the center of their life.

As I noted in the introduction, James France understood the lens through which we receive knowledge of the Cistercian lay brothers as tinted with a "monkish filter." With the absence and near impossibly of texts written by lay brothers, it is stunning to see a contemporary Benedictine text that explores many of the metalworking techniques that Cistercian lay brothers must have practiced. Theophilus Presbyter, a pseudonymous Benedictine monk-priest in 12th century Germany, was the author of a three-part treatise on painting, glasswork, and metalwork. His work explored the techniques, materials, and tools necessary to a variety of metallurgical and artistic processes, including directions on what kind of spaces to build for the various crafts one could undertake from reading his text. Theophilus was a contemporary counter-example to the Cistercian *conversus* blacksmith, in some sense his social opposite within the bounds of the monk-laborer relationship. He was a Benedictine monk-priest, able to write, read, and reproduce his laborial, technological, theological, and spiritual experiences in a book that not only circulated widely in his own time, but has continued to circulate into the present. It is necessary to note that texts like Theophilus' were rare in his time, to the point that he

addresses the oddness of writing down technical knowledge in a treatise when the mode through which technical and artistic information had normally been passed down for centuries was through master-apprentice relationships, physical practice, and oral tradition.[68] For this reason, it is possible that no lay brother, no matter how masterful at his craft, would have had the desire to transmit his knowledge through any other means than by the direct teaching of apprentices. Yet there is still that barrier, the regulations of the Cistercian Order that held lay brothers in a place where technical knowledge was necessary to work and life, but was ultimately limited to the immediate space of the forge.

It is the strict regulation on speech, writing, and other forms of communication that causes the lay brother voices from the space of the forge to be all but lost in the written documents that survive. That the absence of the voices of the *conversi* in modern scholarship parallels the absence of their voice within the bounds of medieval Cistercian monasticism and its written histories is not coincidence. Rather, the two absences result from the same mechanisms, namely the statutes of the General Chapter and the lay brother usages that guided their everyday life. In this sense, the statutes and usages are effective into the present, where research of the documents and the histories within them reproduces their original purpose, their silencing effect on the voices of lay brothers.

Heavy reliance on the written archive, especially when scholarship favors the narratives of monks, allows the researcher to feel sympathy only with those whose written and fabricated works have survived the erosion of the past's written, material, and

[68] Theophilus, *De Diversis Artibus*, 2-3.

experiential traces, erosion caused by the movement of history and the selective sieves of scholarly work. We are able to identify ourselves with Theophilus and his practices, as well as receive his knowledge and experiences, because of his relative freedom to speak, write, and circulate his work. The 12th and 13th century legislation, regulations, and punishments that restricted the speech and literacy of Cistercian lay brothers are still effective today, in that they prevented any written transmission of knowledge or experience through books and documents and thus continue to deny the voice of those lay brothers into the present.

Perhaps the silence is kept less on the lay brothers specifically, but on workers and the goings-on of the workshops, which included both monks and lay brothers and their labor. Was there an intentionality, on the part of monks and abbots and legislators, behind the absence of these voices? It is certain that the regulations that kept workers silent continue to function in the present for those who search for a voice, for those in the present who yearn to hear something. Are the workers asking to be heard? Do they have anything they want(ed) to communicate?

Have the knowledge and experiences they accumulated continued on in other forms? In the extant workshops? In the remaining hammers, nails, tongs, anvils, horseshoes, hearths, and metal fragments? Have their knowledge and practices circulated and survived through oral traditions and master-apprentice relationships? Questions can be generated endlessly from the all-too-visible absences in the material and written remains of the lives of Cistercian lay brothers. The tension between scholarly research and the documents central to regulating the lives of lay brothers, which simultaneously

describe the brothers' experiences in great depth and restrict their ability to tell it, will not be easily resolved, but perhaps it is best to weigh those documents differently, and seek other ways of thinking through their lives and experiences.

The Lay Brother Blacksmith at Fontenay

In an effort to bring the experiences of monastic workers to the fore, this chapter will follow lay brother blacksmiths through their daily work, stringing together technical processes, spiritual practice, and the physical and architectural space of the forge. It will take the forge at Fontenay as its focus. As a reconstruction of a lay brother blacksmith's day, this chapter seeks to account for some of that which is missing from the sources that concern their lives, most importantly the confluence of their technical work, the space they inhabited, and the spiritual mission of the monastery. My reconstruction of their daily lives and the complexities of the space they inhabited is inevitably limited to the sources from which I pull, and I am unable to encompass the diversity of experiences had by the lay brothers who worked at Cistercian forges. The image of Cistercian life I construct here is necessarily a collage, a layering of different aspects of Cistercian life, from iron production to contemporary Benedictine practices to regulations on movement, communication, and dress to the sounds of speech and ringing metal, in order to reach something of a coherent sense of the life of the lay brother blacksmith.

The first strike of the lay brother's hammer rang out like the bell that called him to prayer early each morning. The stone walls of the tall, square room returned the sound

back toward him and his fellow lay brothers, sustaining it among the layers of repeated blows of the hammer that each brought to his anvil. They stood clustered around the large open mouth of the forge, some waiting for their bar of cooled black iron to match the burning orange coals of the fire, some already working and shaping their heated metal. Once his stock returned to a cool red-black, the lay brother stepped toward the forge and plunged the iron into the heart of the coals. He pumped the bellows, breathing air into the forge until both the fire and iron came to a glowing orange-yellow. Securing the cooler end of the bar with tongs, the lay brother brought the iron out over his anvil, laid it flat, and brought his hammer down on the top face of the metal. Each strike he made flattened the ingot a small amount, slowly, almost unnoticeably splaying it out across the surface of the anvil. To keep the shape symmetrical, the brother rotated the ingot on its side and struck it in the same way until it appeared even all around. The orange glow of the ingot quickly dimmed down to a deep, muted red with these few strikes. The original, uniform shape of the iron was drawn out, newly lengthened and thinned. Every additional heating of the metal required greater and greater attention to its integrity, as the fire would more easily heat up and eat away at thinner parts of the stock. If the brother needed to finely manipulate the thin metal, the pace of his movements from the forge to the anvil picked up. A few pumps of the bellows sufficed to bring the metal back to a workable yellow-orange color. A quick but sure turn of his body brought the work over the anvil, and a series of light taps and adjustments of the metal returned it to a cool red.

Endless repetitions brought the lay brother to a confidence in his strikes. He became absorbed in the shaping of the metal, so that the room full of other brothers doing

much the same work to their own rhythms melted away. After a time, his superior, the master of the forge, got his attention and brought him and the other lay brothers to the space in the main room where they normally discussed the tasks for the day. Here, the brothers stood and listened to the *magister conversorum*, who was making his weekly visit to the forge. He gave them a short talk, reminding them of their duty to maintain obedience to those above them, to treat their commands as though they were the abbots' and to listen carefully and silently. He left, and the brothers returned quietly to their work.

The hour of Prime came soon, and the brothers set down their hammers and tongs on the lip of the forge. Bowing their heads, they intoned three psalms, and continued in unison: "Glory be to the Father." While their words hung in the tall room, they began a hymn, whose echoes bled into the final "Lord have mercy." After a brief pause, the room again filled with the sound of ringing iron.

This tracing of the lay brother's day is incomplete, but it seeks to situate the lay brother and his work in the forge at Fontenay, in the attempt to bring out the experiences of the lay brother blacksmiths that are otherwise difficult to see, hear, and understand. This narrative is meant to be the beginning of a cycle, a way of appreciating the confluence of the boundaries and structures experienced by the lay brother blacksmiths of the Cistercian Order and comprehend the cycles they felt from day to day. Ever present is the sound of their space, and any further work on lay brother blacksmiths and the spaces

they inhabited must account for the centrality of sound and speech in the structures of their daily life.

I affirm that I have adhered to the honor code in this assignment. Jacob Roosa

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Figure 2: “Schéma d’évolution de la Forge de Fontenay,” Evolution of the plan of the forge at Fontenay, in Paul Benoit and Denis Cailleaux, *Moines et métallurgie dans la France médiévale.* Paris: Association pour l'édition et la diffusion des études historiques,

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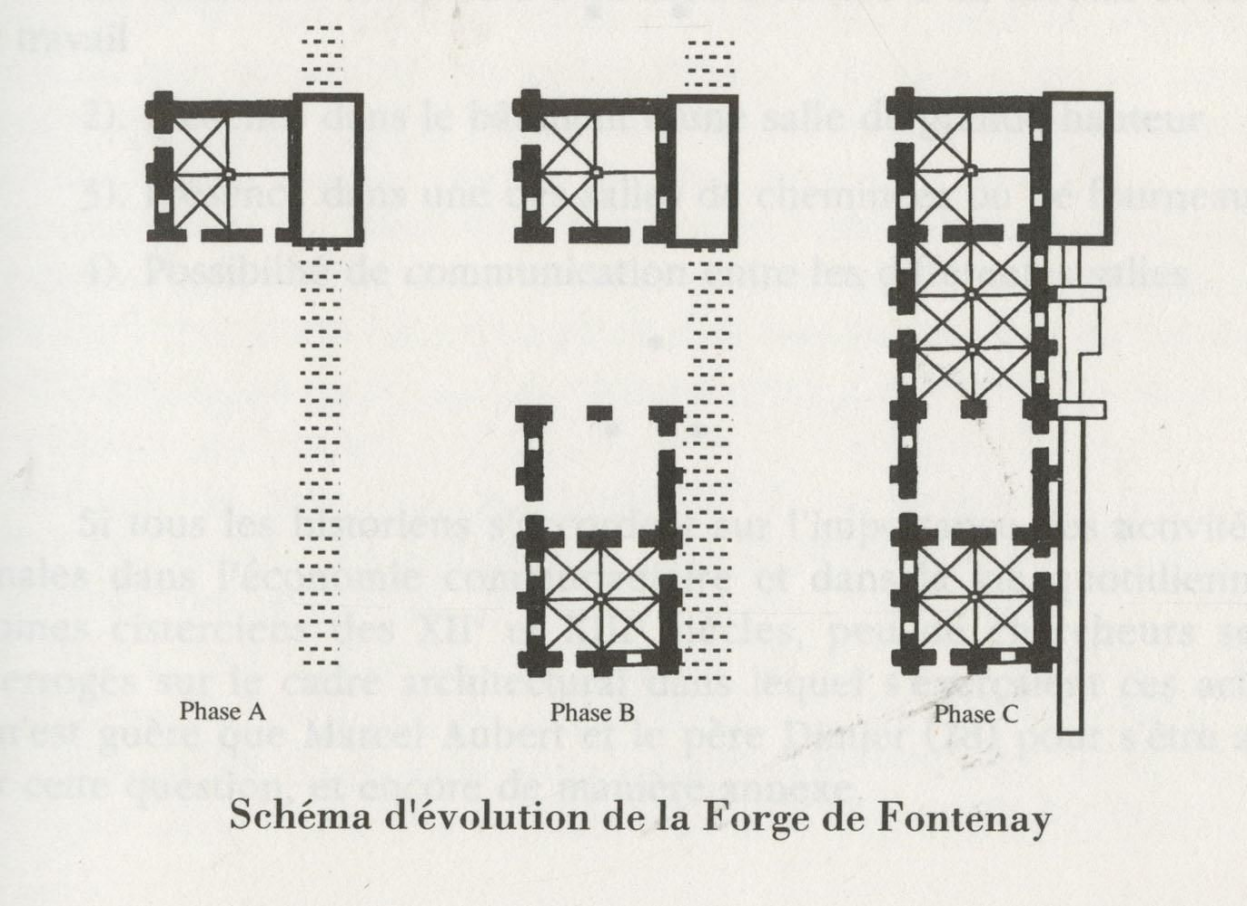

Figure 3: Fontenay Abbey Forge Chimney and Reconstruction of Blacksmithing Operation, Available from: Wikimedia, https://upload.wikimedia.org/wikipedia/commons/2/29/Abbaye_Fontenay_forge_chemin

%C3%A9e.jpg (Accessed April 14, 2017).

Figure 4: Hydraulic Hammer in Reconstruction of Forge at Fontenay, Available from: Abbaye de Fontenay, http://www.abbayedefontenay.com/cache/advportfoliopro/xl_marteau1_jpg_791dee6485

34ceb296c5f7fce1612346.jpg (Accessed April 14, 2017).

Figure 5: “Grande salle de la Forge,” Fontenay forge interior, Lucien Bégule, in his *L'abbaye de Fontenay et l'architecture cistercienne.* Paris: H. Laurens, 1928: 79.

Figure 6: "Salle capitulaire," Fontenay chapterhouse interior, Lucien Bégule, in his *L'abbaye de Fontenay et l'architecture cistercienne.* Paris: H. Laurens, 1928: 43.

Figure 7: "Comparative smithy plans: Waltham, Fountains, Bordesley (period 4), and Kirkstall Abbeys, Alstead and Goltho," in Grenville G. Astill, *A Medieval Industrial Complex and its Landscape: The Metalworking Watermills and Workshops of Bordesley*

Abbey. CBA Research Report 92, Council for British Archaeology, 1993: 280. (see next page)

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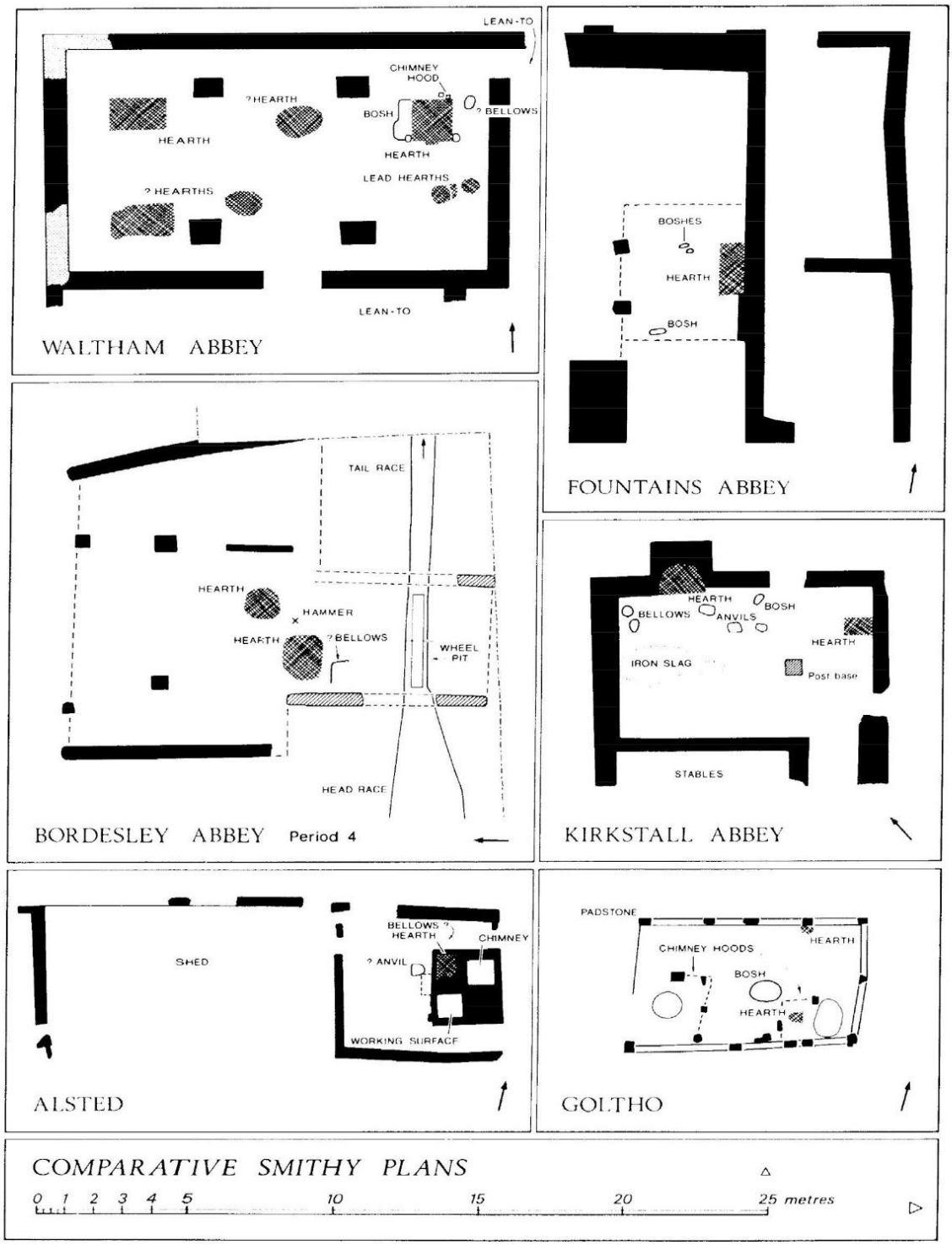

Figure 118 Comparative smithy plans: Waltham, Fountains, Bordesley (period 4), and Kirkstall Abbeys, Alsted, and Goltho

Figure 8: Architectural plan of Fountains Abbey woolhouse and malthouse, in Coppack, Glyn. *Fountains Abbey: The Cistercians in Northern England.* Stroud, Eng., and Charleston, S.C.: Tempus, 2003: 97.

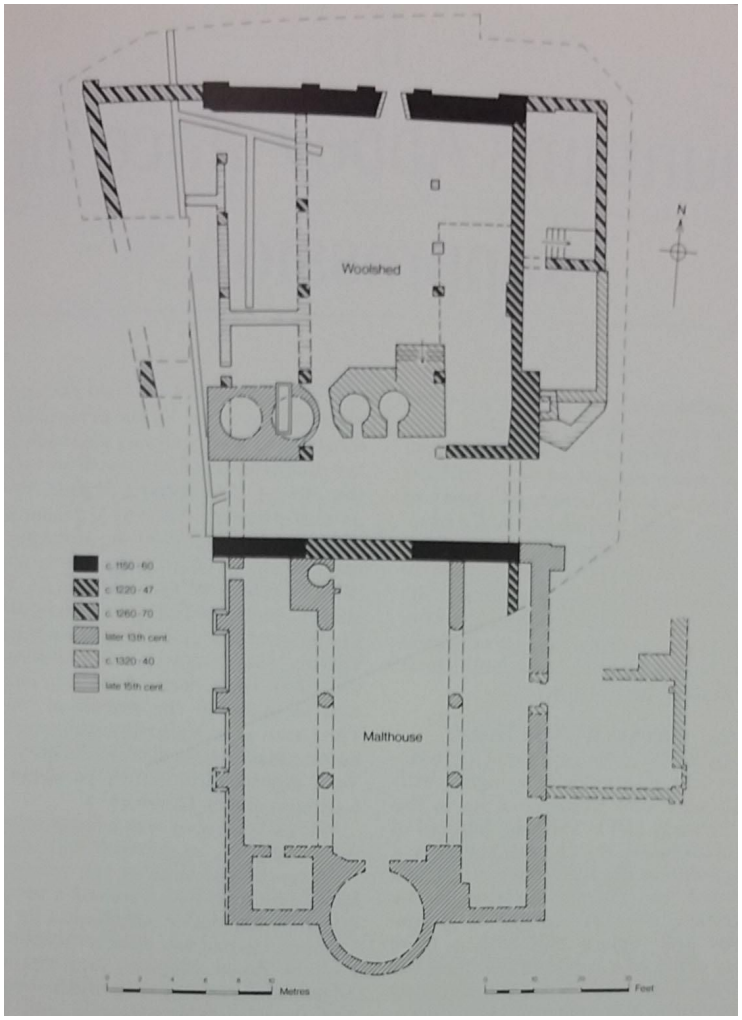

Figure 9: “Mill (BAB): reconstruction of period 3 mill, from the south-west,” a reconstruction of the Bordesley forge from the late 12th and early 13th centuries, D. A. Walsh, in Grenville G. Astill, *A Medieval Industrial Complex and its Landscape: The Metalworking Watermills and Workshops of Bordesley Abbey.* CBA Research Report 92, Council for British Archaeology, 1993: 263.

Figure 113 Mill (BAB): reconstruction of period 3 mill, from the south-west (D A Walsh)

Figure 10: Late 12th century hammer found at the forge site at Bordesley Abbey, in Grenville G. Astill, *A Medieval Industrial Complex and its Landscape: The Metalworking Watermills and Workshops of Bordesley Abbey.* CBA Research Report 92, Council for British Archaeology, 1993: 168.